HW 7 Graphing Trig Functions (13.5) **Name** Key

I will be able to use periods, amplitudes, and shifts to graph sine and cosine functions.

Amplitude: $A = \frac{(\max - \min)}{2}$ **Period:** $\frac{360}{B}$ **where B is the number in front of θ**

Basic Equations: $y = A\sin(B\theta - C) + k$ $y = A\cos(B\theta - C) + k$

Identify the amplitude and the period of each function.

1.) y = 2.5 sin(θ)

amp: 2.5
period: 360°

2.) y = -5 cos $(\frac{1}{2}\theta)$

amp: -5
period: $\frac{360}{1/2}$ = 720°

3.) y = 1.5 sin (4θ)

amp: 1.5
period: $\frac{360}{4}$ = 90°

4.) y = 3 cos (θ + 90°)

amp: 3
period: 360°

5.) y = -2 sin (θ - 30°)

amp: -2
period: 360°

6.) y = -6 sin $(\frac{1}{4}\theta)$

amp: -6
period: $\frac{360}{1/4} = 360 \cdot 4 = 1440$

Identify the vertical and horizontal shifts for each function.

7.) y = sin (θ - 90) + 3

vertical: +3 up

horizontal: +90° right

8.) y = cos (θ - 45) - 2

vertical: -2 down

horizontal: +45° right

9.) y = 2 + cos (θ +45)

cos(θ +45) + 2

vertical: +2 up

horizontal: -45° left

10.) y = 3 - sin (θ - 45)

-sin (θ -45°) + 3

vertical: +3 up

horizontal: +45° right

11.) y = 3 sin (2(θ -135)) - 3

2θ - 270°

vertical: -3 down

horizontal: +270° right

12.) y = 4 cos (3 (θ + 180)) + 1

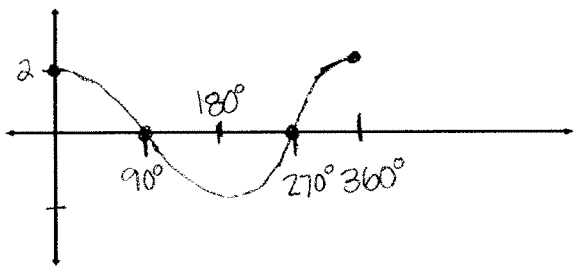
3θ + 540°

vertical: +1 up

horizontal: -540°

Give the information for each function. Graph at least one period of each function.

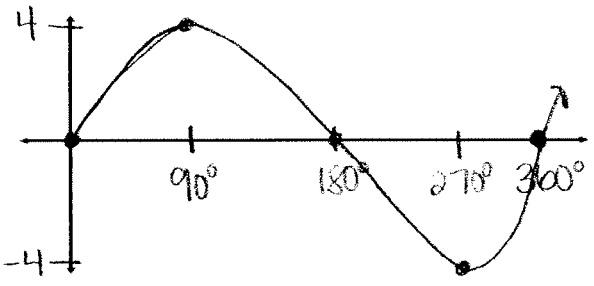
13.) y = 2 cosθ



Amplitude: 2 Period: 360°

Horizontal Shift: none Vertical Shift: none

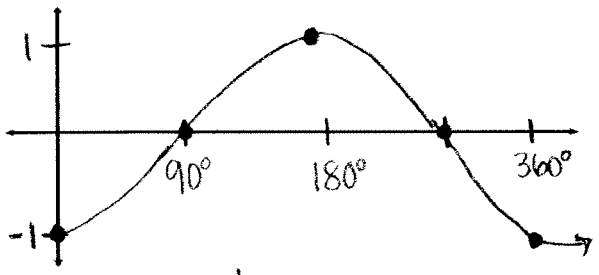
14.) y = 4 sin θ



Amplitude: 4 Period: 360°

Horizontal Shift: none Vertical Shift: none

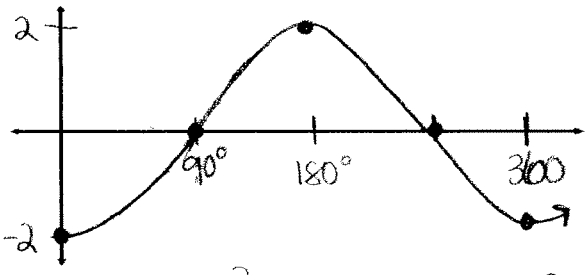
15.) $y = \sin(\theta - 90)$



Amplitude: 1 Period: 360°

Horizontal Shift: +90° Vertical Shift: none

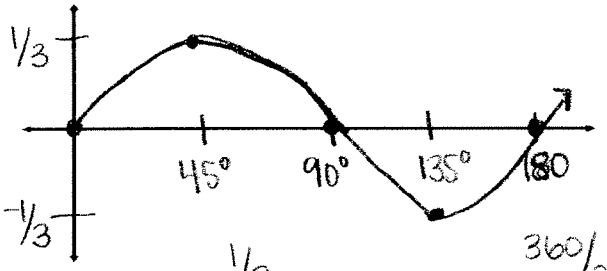
16.) $y = 2\sin(\theta - 90)$



Amplitude: 2 Period: 360°

Horizontal Shift: +90 Vertical Shift: none

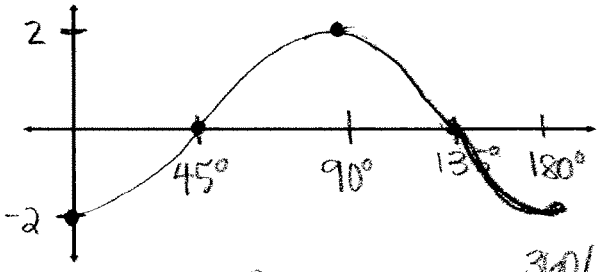
17.) $y = \frac{1}{3}\sin(2\theta)$



Amplitude: 1/3 Period: 360/2 = 180°

Horizontal Shift: none Vertical Shift: none

18.) $y = -2\cos 2\theta$



Amplitude: -2 (flip) Period: 360/2 = 180

Horizontal Shift: none Vertical Shift: none

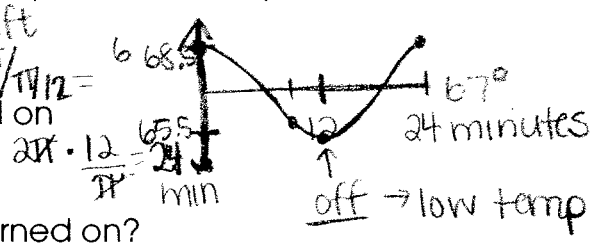
Application

The temperature in an air-conditioned office on a hot day is modeled by the function

$$\mathbf{T(x)} = 1.5\cos\left(\frac{\pi x}{12}\right) + 67$$

vertical shift

Period $2\pi / \pi/12 =$



$2\pi \cdot \frac{12}{\pi} = 24$ min

x is the time in minutes after the air conditioner is turned on

T(x) is the temperature (°F) at a certain time (x)

a.) How long does the air conditioner run after being turned on?

12 minutes

b.) Find the maximum and minimum temperatures in the office building.

max = 67 + 1.5 = 68.5°F min = 67 - 1.5 = 65.5°F

c.) Find the temperature 10 minutes after the air conditioner was turned on.

$T = 1.5\left(\cos\frac{\pi(10)}{12}\right) + 67 =$ 65.7°F *RADIAN MODE